What is claimed is:

1. A system for damping oscillations in channels, which carry fluid, in a component with the following steps:

a) oscillations that occur being detected by sensors,

b) after the detection the results are supplied in the form of a control loop to actuators,

c) the actuators are piezoelectric elements in the form of thin plates, films or layers and

d) by activation of said actuators oscillations are produced, which are in antiphase to the oscillations produced by turbulence in the fluid, and whose frequency and amplitude are at least approximately the same.

2. The system as claimed in claim 1, wherein said actuators and said sensors are arranged in the region of turbulence zones on or in the component.

3. The system as claimed in claim 1, wherein actuators and sensors are arranged in the region of the greatest expected deformation.

4. The system as claimed in claim 3, wherein said sensors and the actuators are arranged in the region of channel direction changes.

5. The system as claimed in claim 1, wherein said sensors are piezoelectric elements.

6. The system as claimed in claim 5, wherein said piezoelectric elements are arranged alternately as sensors and as actuators in the component.

7. The system as claimed in claim 5, wherein all of said piezoelectric elements act as sensors in the quiescent state or when the oscillation excitation is

low, and selected elements are activated as actuators as a function of oscillation excitation.

8. The system as claimed in claim 1, wherein an adaptronic control loop is provided.

9. A system for damping oscillations in cooling channels of an optical element in a projection exposure objective for semiconductor lithography with the following steps:

a) oscillations that occur being detected by sensors,
b) after the detection the results are supplied in the form of a control loop to actuators,
c) the actuators are piezoelectric elements in the form of thin plates, films or layers and
d) by activation of said actuators oscillations are produced, which are in antiphase to the oscillations produced by turbulence in the fluid, and whose frequency and amplitude are at least approximately the same.

10. The system as claimed in claim 9, wherein said actuators and said sensors are arranged in the region of turbulence zones on or in the optical element.

11. The system as claimed in claim 9, wherein actuators and sensors are arranged in the region of the greatest expected deformation.

12. The system as claimed in claim 11, wherein said sensors and the actuators are arranged in the region of channel direction changes.

13. The system as claimed in claim 9, wherein said sensors are piezoelectric elements.

14. The system as claimed in claim 13, wherein said piezoelectric elements are arranged alternately as sensors and as actuators in the component.

15. The system as claimed in claim 13, wherein all of said piezoelectric elements act as sensors in the quiescent state or when the oscillation excitation is low, and selected elements are activated as actuators as a function of oscillation excitation.

16. The system as claimed in claim 9, wherein an adaptronic control loop is provided.